Planning Considerations for Over Snow Movement

Reference for this class is NWTC Cold Weather Operations Manual: C012

Planning Considerations for Over-snow Movement

- ***Individual Movement Techniques***
- ***Route Planning Considerations***
- ***Trail Breaking***
- ***Rates of March***

Paul Thakur

BOLIO LAKE – Two 172nd Separate Infantry Brigade soldiers and a Cold Regions Test Center employee check out a Stryker Infantry Carrier Vehicle.

POLARIS

M973 Small Unit Support Vehicle

Individual Movement Techniques

- ***Skiing***
- ***Snowshoeing***
- ***Skijoring***

Use Skis When...

- ***Long distances must be traveled***
- ***Stealth is necessary***
- ***Conditions allow***

Military Skiing

Most military skiing is done on flat or rolling terrain that requires the use of cross-country (Nordic) skills. Tactical considerations may require skiing down steep slopes using downhill (Alpine) skills. Gaining and maintaining a downhill skiing capability within military units present a major training challenge.

Military skiing instructed here by the Northern Warfare Training Center, is divided into eight ski lessons. The Logical Progression of ski instruction starts with basic fundamentals and works toward the advanced level. The course is designed for All Terrain/ Back Country progression. The times listed for each ski lesson are an average and should not be considered "Engraved In Stone". Each ski lesson should be student paced. In this manner the lesson is understood and achieved by all, before progressing to the next lesson.

Military Ski Lessons

Ski Lesson 1: Nomenclature, Maintenance, Fitting, Introduction to Movement on Skis

Ski Lesson 2: Hill Climbing and Gentle Descents

Ski Lesson 3: Basic Cross-Country

Ski Lesson 4: Wedge Turns; Intermediate Cross-Country

Ski Lesson 5: Basic Nordic Downhill

Ski Lesson 6: Intermediate Nordic Downhill, and Advanced Cross-Country

Ski Lesson 7: Advanced Nordic Downhill

Ski Lesson 8: Advanced Nordic Downhill

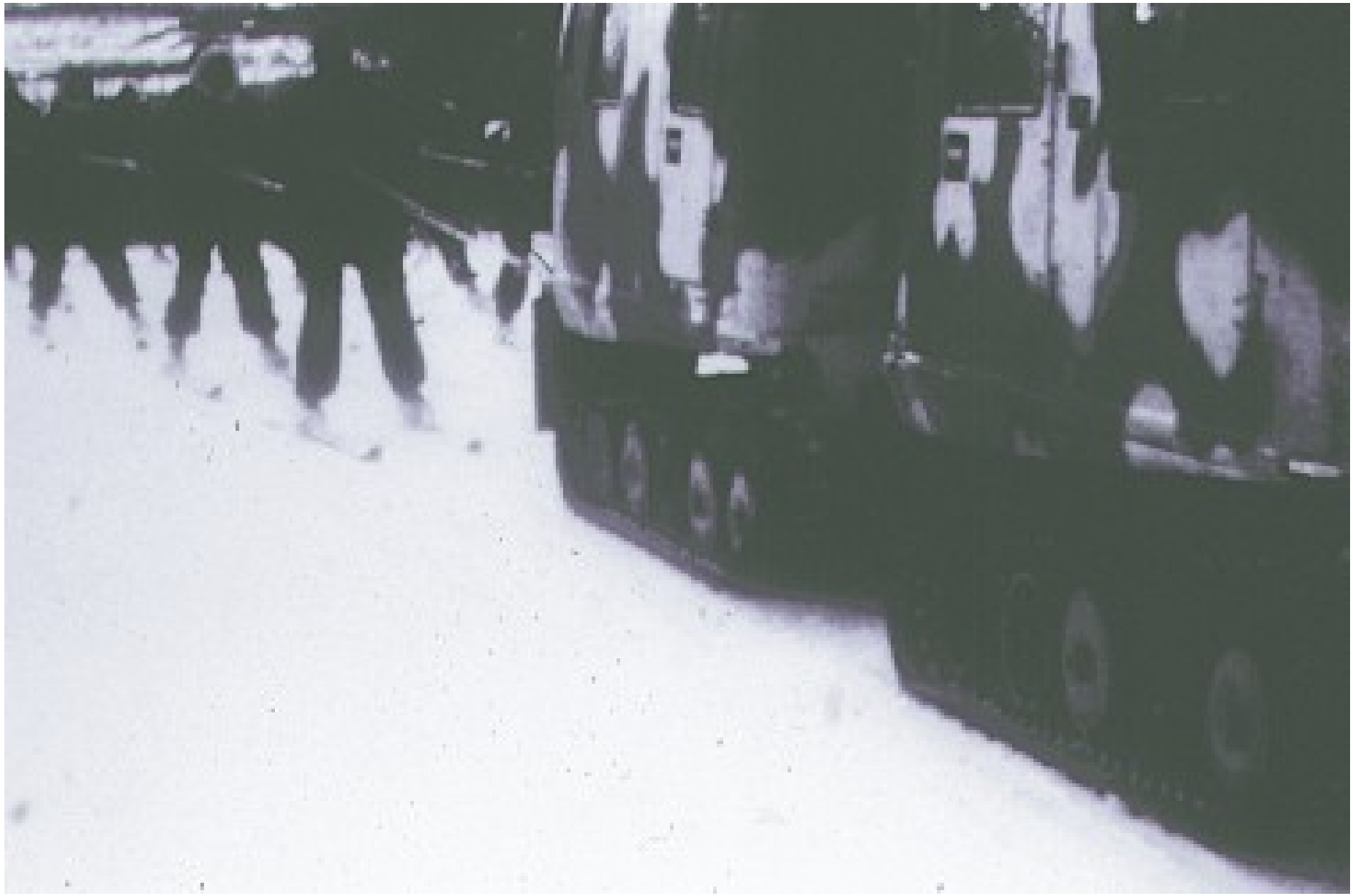
Skijoring

The benefits of skijoring are often overlooked, or dismissed as being a technique that requires an inordinately large amount of training to successfully execute. Actually, the payoff gained by being able to rapidly move large numbers of troops and equipment over long distances for the minimum training time invested can be a big plus. NOTE: At maximum payload, a planning radius of 90 miles is appropriate for the SUSV.

Things to remember:

- ***A soldier should have a minimum of 40 hours of ski training prior to attempting to skijor.***
- ***Commanders must do a written risk assessment.***
- ***Maximum vehicle speed is 15 mph (24 kph)***

Skijoring



Use Snowshoes When…

- ***Moving through heavy brush***
- ***Terrain is rough***
- ***Troops are not proficient with skis***

Snowshoeing

Have soldiers move over snow covered terrain:

- ***The feet are kept apart slightly wider than normal to prevent stepping on or catching the other snowshoe.***
- ***The toe of the snowshoe is raised just high enough with each step to clear the snow as the tail slides over it.***
- ***On flat and gentle slopes ascent is made by climbing straight uphill***
- ***Steeper terrain is ascended by traversing and packing a level trail similar to a creating a shelf across it.***
- ***Ski poles may be used as an aid to balance, especially when carrying heavy loads and/or moving uphill.***
- ***Movements***
  - ***Walking***
  - ***Step turn***
  - ***Kick turn***
  - ***Negotiate obstacles***

Route Planning Considerations

In addition to the tactical situation consider:

- ***Map recon for route selection; feasibility of route during limited visibility***
- ***Movement technique (skis, snowshoe, foot)***
- ***Soldiers Load***
- ***Use of vehicles***
- ***Terrain and Weather***

Route Planning Considerations: Open Terrain

- ***Break only one set of tracks***
- ***Follow tree lines/natural terrain features***

Route Planning Considerations: Hills / Mountains

- ***Use gentle traverse to ascend or descend***
- ***Follow contours once elevation is gained***
- ***Avalanche considerations***

Route Planning Considerations: Water Routes

- ***Generally excellent for navigation***
- ***Check ice thickness (Appendix A)***
- ***Stay close to shore or bank***

Load Bearing Capacity of Fresh Water Ice

Minimum Ice Thickness			
Load	***Minimum One Time Only***	***Normal Repeated Use***	***Distance Between Units***
Soldier on skis	**1.5 inches**	**2 inches**	**5 meters**
Soldier on foot	**3 inches**	**4 inches**	**5 meters**
¼ ton truck	**5 inches**	**8 inches**	**16 meters**
HMMV/CUCV	**10 inches**	**13 inches**	**27 meters**
SUSV	**10 inches**	**13 inches**	**27 meters**
UH-60/CH-47	**15 inches**	**18 inches**	**80 meters**

Route Planning Considerations: Night Movement

- ***Breaks in contact and long halts can cause cold weather injuries***
- ***Route must follow easiest possible terrain***
- ***Route must be well marked***

Trailbreaking

Rule-of-thumb - trail-breaking party should be one-third of the total forces moving

Trail Breaking Team

POSITION	EQUIPMENT	DUTIES
Breaker	machete	breaks initial trail
Straightener	machete, ax	improves trail
Squad Leader	compass, maps, watch	selects route
Right Cutter	machete, ax	improves right side
Left Cutter	machete, ax	improves left side
Team Leader	shovel	rotates team, packs trail

Resting Team

POSITION	EQUIPMENT	DUTIES
Team Leader	shovel	under squad leader control
Breaker	machete, trail markers	
Straightener	machete, ax, wire cutters	
right cutter	machete, ax	
left cutter	machete, ax	

Planning Rates of March

Movement Mode and

Movement Mode	Unbroken Trail	Broken Trail
On foot- less than one foot of snow	1.5 to 3 kph	2 to 3 kph
On foot- more than one foot of snow	.5 to 1 kph	2 to 3 kph
Snow Shoeing	1.5 to 3 kph	3 to 4 kph
Skiing	1.5 to 5 kph	5 to 6 kph
Skijoring	N/A	8 to 24 kph

(expected rates of march for troops carrying rucksacks over gently rolling terrain)

Effects of Terrain Angle on Speed

Uphill-

Add 1 hour for every 1000 foot increase in elevation

Downhill-

Add 1 hour for every 1600 foot decrease in elevation

Practical Exercise

Your mission is to conduct a deliberate attack. The distance from your LD to assault position is 5 km.

Your route follows a unbroken trail crossing two ridge lines. The first is 550 feet above the surrounding terrain; the second is 450 feet.

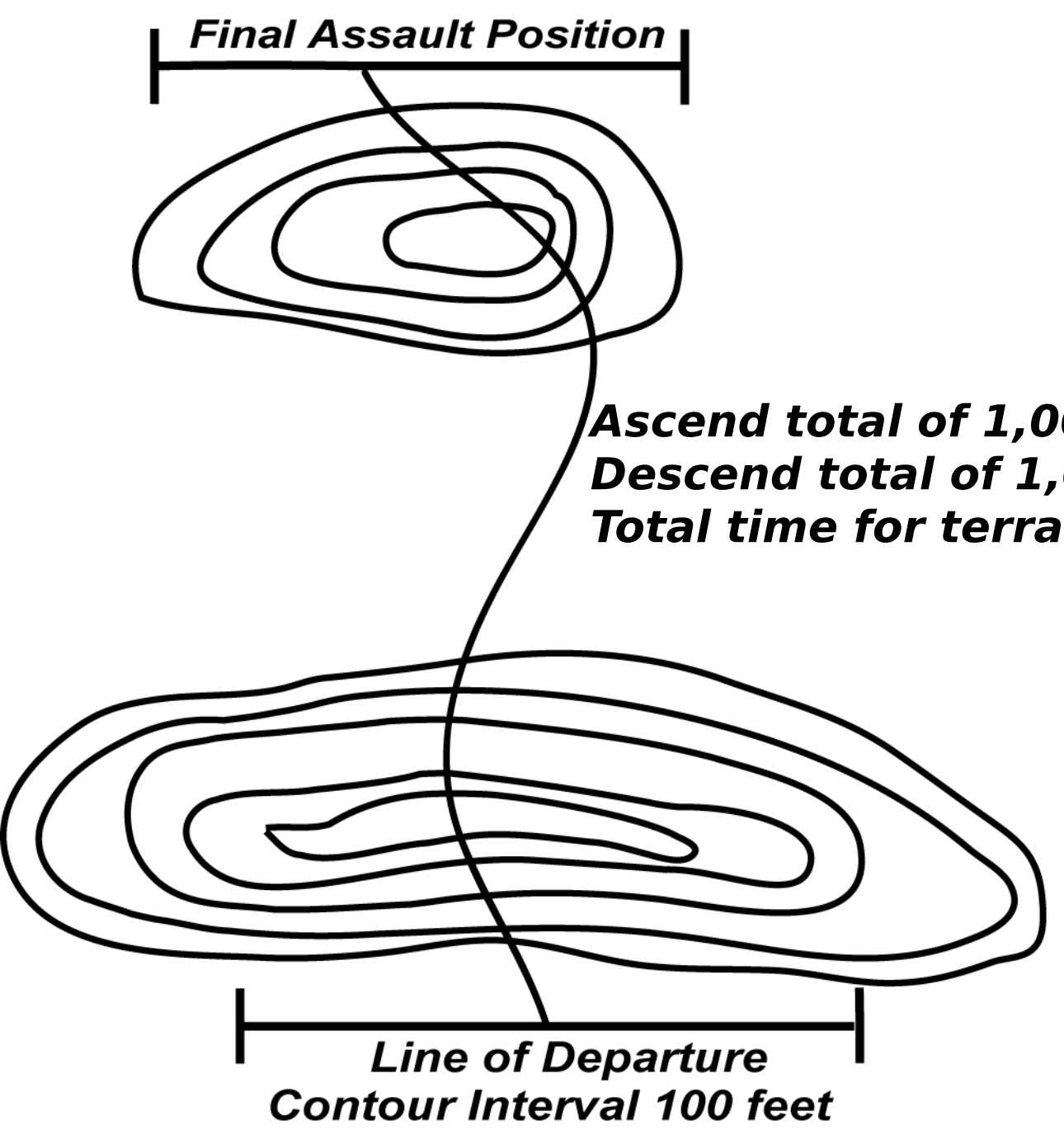
There are 18 inches of snow on the ground. Your troops are proficient on snowshoes but not on skis.

Movement Mode	Unbroken Trail	Broken Trail
On foot- less than one foot of snow	1.5 to 3 kph	2 to 3 kph
On foot- more than one foot of snow	.5 to 1 kph	2 to 3 kph
Snow Shoeing	1.5 to 3 kph	3 to 4 kph
Skiing	1.5 to 5 kph	5 to 6 kph
Skijoring	N/A	8 to 24 kph

Uphill – add 1 hour for every 1000 foot increase in elevation

(or add one minute for every 17 foot increase in elevation)

Downhill – add 1 hour for every 1600 foot decrease in elevation


Final Assault Position
Ascend total of 1,000 feet: Add 1 hour
Descend total of 1,000 feet: Add 40 min
Total time for terrain factor: 1 hour 40 m
Line of Departure
Contour Interval 100 feet

PE Solution

- **5K on 18 inches of new snow on snowshoes**

  3 hours and 20 minutes (1.5km/hr) +

- **"Terrain factor" - (effect of hills)**

  1 hour and 40 minutes

  = 5 hours

Summary